

## One-Way Ranging to the Planets

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### Abstract

*Often the increase in mission complexity of flying an active laser system to the planets limits the opportunities for attempting laser tracking of planetary spacecraft. The best and most accurate method is generally considered to be the transponder approach that involves active laser systems at both ends of the link. But because of the increased complexity, risk and cost of a two-way system we have been forced to consider the value of a one-way measurement in which most of the complexity and costs are at the Earth terminal, and therefore more palatable and “fixable” should issues arise. This was the choice for LRO and hence the development of the LR system which was minimal in cost and required almost no additional spacecraft resources. The advantage of “one-way” is clear for distances of several AU if the issues of precision versus accuracy can be resolved and the opportunities for flight are greater.*